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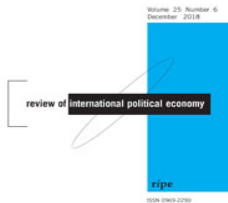
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Valuing knowledge: The political economy of human capital accounting

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ABSTRACT

This article analyzes recent attempts to integrate the value of knowledge into global economic statistics. It outlines how emerging human capital accounting (HCA) standards apply concepts developed to value physical capital goods to the skills embodied in national populations, making its value dependent on lifetime labor market incomes. The intellectual legacy of neoclassical capital theory thereby frames the way in which the value of knowledge is understood in contemporary global governance in politically consequential ways. Drawing upon Karl Polanyi and recent literature on the political economy of measurement, it argues these methodologies reproduce the 'economistic fallacy', as they assume the exchange value of educational investment can be meaningfully isolated from its broader economic, cultural and social functions. Such metrics consequently naturalize politically contestable assumptions, reflecting comparative institutional factors rather than the substantive contribution of education to human welfare. A case study of the influence of HCA on the World Bank's Human Capital Project demonstrates how the diffusion of these valuation methods has implications for which national policy agendas are deemed 'sustainable', particularly within debates on the future of welfare policy. This case illustrates the wider importance of global accounting practices in constructing national economic policy space.

KEYWORDS

Human capital; national accounting; measurement; world bank; global governance; development

1. Introduction

Since the 1990s, with the emergence of endogenous growth theory (Romer, 1994), knowledge has increasingly been viewed as the central economic asset of advanced economies (OECD, 2001). Reflected in global policy discourse and national growth strategies (Peters, 2009), this new way of framing the relationship between knowledge and the economy cuts in two directions. On the one hand, investment in education is increasingly seen as vital to future competitiveness in a globalized and automated world (Jorgenson & Fraumeni, 1992; Schultz, 1993). On the other hand, the imperatives of securing global market share imply that education policy must

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shift to focusing on skills that offer maximum ‘value for money’ – both for individual students and society (Collini, 2012). These trends have crystallized around a renewed focus on ‘human capital’ in global economic and development discourse, that has reconstituted knowledge formation as a strategically important national investment (WB, 2018b).

As a result of these broader ideational shifts, recent years have seen efforts to measure the value of human capital in ways consistent with the United Nations (UN) System of National Accounts (SNA), the central global framework for measuring economic performance (OECD, 2012). Catalysed by the Stiglitz-Sen-Fitoussi Commission and the wider ‘beyond GDP’ agenda (Stiglitz et al., 2010), in 2013 an international task force on measuring human capital was set up by the Conference of European Statisticians (CES). After a global consultation, the UN’s Economic Commission for Europe (UNECE) produced an international framework for national human capital accounts (2016), with the World Bank subsequently producing estimates of national human capital stock based on this methodology (WB, 2018a). These international initiatives have informed and drawn upon parallel projects by national statistical institutes (NSIs) (ONS, 2015; Statistics Canada, 2010; Statistics Norway, 2018). Work on human capital accounting (HCA) must be situated within broader ideational shifts within global economic governance discourse that have expanded the concept of national wealth beyond manufactured and financial assets to include natural resources, ecosystems and social institutions (OECD, 2001; WB, 2018a). This wealth accounting approach, which frames sustainability in terms of the preservation a comprehensive national balance sheet, has become the dominant framework for measuring sustainable development (UNECE & Eurostat & OECD, 2008; UNEP, 2014).

The importance of human capital accounting within statistical agencies and international organisations (IOs) is consequently growing. As the UNECE guide indicates:

Understanding and quantifying human capital is becoming increasingly necessary for policymakers to better understand what drives economic growth and the functioning of labour markets, to assess the long-term sustainability of a country’s development path, and to measure the output and productivity performance of the educational sector (UNECE, 2016, p. iii).

However, in contrast with the attention given to the politics of ‘natural capital’ valuation, it has received relatively little attention within International Political Economy (IPE) literature. Nevertheless, just as with natural capital, the valuation of knowledge by powerful governance institutions has significant political implications. If left to the technical discourse of national accounting expertise, important questions risk remaining unanswered: how do emerging global accounting standards for human capital frame national economic policy space? What theories and ideas underpin these valuations, and which assumptions about the economic and social value of knowledge do these naturalize? What implications do international measurement practices have for democratic debates on the role of education systems and labor markets in meeting the welfare challenges of the twenty-first century?

This article answers these questions by critically evaluating the development and use of global HCA standards. Drawing on 140 policy reports and methodological guidelines (primarily UN, World Bank, OECD and ONS sources), as well as 30

semi-structured interviews with statistical and accounting experts, its central contribution is to de-naturalize the assumptions that underpin the valuation of national human capital stocks and assess the way in which they frame national economic policy space. In doing so, it contributes to recent debates on the political economy of economic statistics and measurement (Miller, 2008; Davis et al., 2012; Hansen & Porter, 2012; Linsi & Mügge, 2019; Aragão & Linsi, 2020), uniting this with the literature on labour markets, social reproduction and the future of welfare systems (LeBaron, 2010; Steans & Tepe, 2010; Standing, 2017).

Section 2 outlines how the intersections between national development policies and global HCA practices – the ‘IPE of human capital accounting’ – has yet to be sufficiently theorized in IPE literature. It introduces Karl Polanyi’s constructivist and historical analysis of neoclassical economic ideas (Polanyi, 1968, 1977), and insights from recent literature on the political economy of measurement, as a framework to orient an inquiry into global HCA practices. Section 3 outlines the intellectual genealogy of the contemporary HCA agenda, analyzing Irving Fischer’s seminal neoclassical theory of capital (Fischer, 1906) and its influence on ‘comprehensive wealth accounting’ which now dominates sustainability measurement in global economic governance. Section 4 demonstrates how the global HCA agenda has grappled with the problems of applying historical accounting concepts to the knowledge embodied in national populations. Finally, the article explores the political implications of these measurement practices for global education and welfare policy. Through a case study of the influence of HCA on World Bank funding priorities through its Human Capital Project, it demonstrates how the growing use of these measures frames policy responses to contemporary welfare challenges, delegitimizing those that rely on de-commodification or non-market institutions. Under current methodologies, such policies erode the human capital base of a country and necessarily appear *unsustainable*, regardless of their substantive effects on economic welfare. The analysis also highlights how HCA has encountered persistent operational challenges. The article thus demonstrates how measurements of the value of knowledge exert increasing influence on global economic governance, while emphasising their contingency and inherently political nature.

2. Theorising the political economy of human capital accounting

This section develops a theoretical framework for conceptualising the IPE of human capital accounting. This field of research seeks to understand the links between the measurement tools and accounting standards used to value knowledge by states and IOs, the economic ideas these draw upon and how they frame global education and welfare policy. These issues are growing in importance: firstly, as accounting standards for human capital are developed and mainstreamed within global economic governance (UNECE, 2016; WB, 2018a, 2018b); secondly, as the transition to information and knowledge-based work makes education and skills increasingly important to national economic competitiveness (WB, 2018a; UNEP, 2014); thirdly, as demographic change and automation pose new questions about the role of labor markets in future welfare regimes (Gorz, 1999; Standing, 2017).

2.1. A Polanyian framework for analyzing human capital accounting

Multiple literatures touch on aspects these issues, but the IPE of human capital accounting has yet to be systematically investigated. For instance, from a Foucauldian perspective many studies have analysed the discursive mobilization of ‘human capital’ as a disciplinary rationality of global neoliberal governance, and its implications for the marketisation of global higher education policy (Simons, 2006; Collini, 2012). These have tended to avoid the important question of valuation and measurement. Other research has analysed the valuation of human capital in relation to changes in the accounting practices of private firms (Elias & Scarbrough, 2004), especially in the context of new competitive imperatives stemming from the rise of the knowledge-based economy. Autonomist Marxism (Hardt & Negri, 2005; Spence & Carter, 2011) has emphasized the limitations of capitalist governance in information-based economies, with the shift to knowledge-based work presenting novel difficulties in the measurement and extraction of surplus value. However, since this literature is concerned with accounting practices within the firm, it has not explored the valuation of knowledge by IOs, or the effects of this in framing national policy space.

As a starting point for theorising the global politics of HCA, Karl Polanyi’s historical and constructivist analysis of neoclassical economic thought – in particular his critique of the ‘economistic fallacy’ (Polanyi, 1977, pp. 5-15) – provides a useful conceptual framework. The enduring value of Polanyi’s work lies primarily in his critique of the vision of humanity that emerged alongside the development of market societies, and how this intellectual legacy continues to frame the way in which contemporary political and ethical problems are understood (Holmes, 2012). He highlighted how the contingent historical institutions and norms of modern Western societies were universalized, how ‘strictly time-bound phenomena came to be regarded as timeless, as transcending the age of the market’ (Polanyi, 1968, p. 61). Recent Polanyian scholarship has consequently emphasized the constraining effects of the market view of the economy on contemporary political agency and discourse (Block & Somers, 2014; Dale, 2010, pp. 19-44; Watson, 2005, pp. 143-160). His ideas have particular application in understanding the politics of HCA, as they highlight the distinctive properties of ‘human capital’ as an economic good, stemming from the embodied nature of knowledge and its inseparability from human existence *tout court*. This means accounting and valuation methods predicated on isolating the exchange value of knowledge present distinctive analytical and ethical dilemmas (Yarrow, 2018).

Polanyi’s view rested on a distinction between ‘formalist’ and ‘substantive’ understandings of the economy (Polanyi, 1977, pp. 19-25). Formalist reasoning understands economic problems using an idealized model of market exchange. This narrowed the focus of economic theory down to choices between alternative uses of goods under conditions of scarcity (Dale, 2010, pp. 89-136; Holton, 1992, pp. 7-22), exemplified by Lionel Robbins’ famous definition of economics as ‘the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses’ (Robbins, 2008 [1932]). Thus, an analytical division is created in which ‘the economy’ is constructed as a free-standing object encompassing the allocation of productive resources through the price mechanism,

and ‘politics’ is understood as an equally distinct process through which ethical and social considerations are debated (Holmes & Yarrow, 2019).

This formalist view of the economy was, in turn, dependent upon an ‘economistic fallacy’ (Polanyi, 1977, pp. 5-15): the conflation of the human economy as a whole with market institutions. Moreover, the dominance of this market-centric view of economy and society has distorting effects on democracy and political reasoning. It constrains how societies understand economic problems, narrowing the ideational and conceptual space for ‘adjustment’ (Polanyi, 1968, p. 59) available to confront pressing social, ecological and economic problems. This framework provides a normative and analytical lens through which to analyze how economic ideas and expert practices come to frame the problems of affluent, post-industrial and information-based societies. It highlights how the endurance of economistic fallacies in political reasoning tends to delegitimize, or reduce the saliency of, solutions to social and ecological problems which rely upon de-commodified relationships or commons-based ownership structures, regardless of their potential contribution to substantive economic welfare (Ostrom, 2015).

A distinctive feature of the political economy of HCA is that, in addition to being a vital pre-condition for a functioning market economy, knowledge is also embodied in people - it is a ‘fictitious capital’, to extend the Polanyian concept of a fictitious commodity (Polanyi, 2001 [1944], pp. 136-140). It blends incommensurable (market and non-market) values. Consequently, its economic significance to societies and individuals cannot be reduced to its exchange value - i.e. the labor market returns it yields its ‘owner’ - without introducing analytical problems. Methodological attempts to do this must depend on the fallacy that the labor market returns on education can be meaningfully separated from its broader values. While this analytical fiction may be justified by the aim of achieving methodological consistency with existing global accounting concepts, it is likely to prove difficult to uphold in practice. Furthermore, the diffusion of valuation technologies based upon these assumptions within governance institutions will likely have important political implications, which have yet to be adequately researched.

Polanyian theory gives us valuable conceptual resources to investigate the politics of HCA. This can be usefully supplemented by recent literature on the political economy and sociology of measurement in global economic governance (Miller, 2008; Davis et al., 2012; Hansen & Porter, 2012; Linsi & Mügge, 2019; Aragão & Linsi, 2020). Much of this literature has taken its cue from theoretical work in Science and Technology Studies, to move towards viewing economic theory as ‘performative’ of economic reality (Callon, 1998; MacKenzie, 2005; Muniesa, 2014), while also stressing the importance of technical infrastructures and calculative practices to the way in which economic theory ‘makes its world’. In this literature, the emphasis is not on how economic expertise is ‘wrong’ or ‘right’ in its representations of the world, but how these representations produce effects, remaking the world in their image (Muniesa, 2014).

Polanyi foreshadowed the performative understanding of economic theory *avant la lettre*, suggesting for example that: ‘indisputably the social sciences have a massive influence on man’s [sic] wishes and purposes... by creating the very phenomena on the existence of which they were insisting - such as the utilitarian psychology of the businessman’ (Polanyi, 2014, pp. 114-115). Indeed, foundational works in this tradition cite Polanyi as inspiration (Callon, 1998, p. 2; Mitchell, 2008, p. 118; Çalışkan & Callon, 2009, p. 370). Nevertheless, such insights bring a

sociologically richer and materially situated perspective to Polanyi's normatively inflected analysis of the politics of economic expertise. This literature, with Polanyi, suggests that the notion of 'the economy' as an ontologically distinct object is a remarkably recent achievement, associated with the view of human nature and society which emerged in the eighteenth century. Importantly, however, it demonstrates how this was only solidified in the late twentieth century, through the development of various material practices and infrastructures such as national accounting systems, econometric modelling, macroeconomic forecasting and international development expertise (Mitchell, 1998; Miller, 2008). They thus help supplement Polanyian theory with an appreciation of how the ideas and discourses which produce this reality are always suspended within a substrate of socio-technical expert practices. These must be investigated empirically to fully understand how economic science interacts with political processes (Çalışkan & Callon, 2009).

Recent research has used these insights to extend the constructivist focus in IPE beyond an examination of the impact of economic discourse and language, to explore how apparently mundane technical and methodological practices such as macroeconomic indicators (Davis et al., 2012; Karabell, 2014; Kelley & Simmons, 2015; Mügge, 2016), accounting standards (Christophers, 2011; Mügge & Stellinga, 2015), financial risk metrics (Kranke & Yarrow, 2019) and international benchmarking practices (Broome & Quirk, 2015) also exercise important structuring effects on global economic policy: both directly, as the measurement of economic phenomena such as inflation has immediate distributive effects (Mügge, 2016); and indirectly, by framing the way in which governance problems are formulated and understood, 'locking in' certain theoretical understandings and assumptions and rendering phenomena that are harder to quantify less politically salient (Porter, 1996; Miller, 2008).

One insight of this literature of particular relevance to the IPE of HCA is the insight that attempts to render the world legible using the terms and categories of economics are not equally successful: they do not always 'work' (Callon, 2010). The world often stubbornly resists such projects, calling economistic forms of governance into question. In one sense, this observation supports normative critiques of attempts to reduce complex social phenomena (such as human knowledge) to quantifiable metrics. But it also suggests that these always incomplete attempts to render the world governable by numbers encounter chronic 'overflows' and 'misfires' (Callon, 2010), opening the door to re-politicisation and contestation (Barry, 2002). We should consequently expect knowledge (or 'human capital') to be an especially important 'test case' of both the power and limits of economic expertise to render the contemporary world governable in its terms, as it expands beyond macroeconomics and high finance into pressing post-industrial governance issues such as sustainability, inequality, automation and wellbeing.

2.2. Research methods

Using this conceptual framework, the rest of the article explores the political implications of the growing use of HCA in global economic governance. The empirical analysis draws on semi-structured interviews as well as statistical reports, methodological literature and working papers. An extensive documentary search was conducted prior to interviewing. This involved searching for relevant terms and key words on the websites of major global economic governance institutes (UN, IMF,

World Bank, WTO, OECD), EU agencies and major NSIs. Within-text references to other documents and projects were then traced until saturation point. After filtering out documents of limited relevance, a database of 140 documentary sources was used to map the different actors involved in the global governance of HCA, the different methodological approaches developed, the technical problems associated with these and the policy contexts in which they are used.

To supplement the documentary sources, 30 expert interviews were conducted with statistical experts. Initial interview targets were selected to provide a variety of seniority and job role and even distribution between different statistical agencies. Interviews focused on clarifying the various HCA projects and their relationships, discussing the main technical and conceptual issues confronted in developing HCAs and interviewees' understanding of the use and application of HCA in IOs policy work.

3. Placing knowledge inside the economy: A genealogy of human capital accounting

This section firstly traces the theoretical roots of contemporary HCA frameworks, through an analysis of Irving Fischer's neoclassical theory of capital, showing how this informs the contemporary agenda on comprehensive wealth accounting and sustainability measurement in global economic governance.

3.1. Neoclassical capital theory: Broadening the scope, narrowing the meaning

Through the eighteenth and nineteenth centuries, while various economists attempted to define 'capital' it remained a vague and contested concept (see Fisher, 1896). Reflecting its origins in accounting practice (Carruthers & Espeland, 1991), capital was understood narrowly, as the stock of durable products and equipment owned by merchants or enterprises, which could yield future exchange value (Smith, 1993, p. 162).

In the late nineteenth century, however, capital theory developed in line with subjective theories of value. As part of this, the concept of capital was generalized to encompass all utility-yielding objects. The seminal neoclassical treatment of capital was developed by Irving Fisher. Indeed, Fisher's work is still cited in contemporary governance literature on sustainable development and comprehensive wealth accounting (UNECE & Eurostat & OECD, 2013, p. 64). Fisher critiqued the classical definitions, since they attempted to draw a line neatly around business stock, yielding market returns. But if 'income' was understood in subjective terms, then wealth (or 'capital') should encompass any aspect of the physical world which produced utility (Fisher, 1906, p. 58). Crucial to Fisher's definition of capital was not whether the object yielded a monetary return, but rather the temporal distinction between economic flows and stocks (Tobin, 2005). Fisher argued that 'income' should be understood not as monetary revenue but more broadly as the ongoing flow of desirable experiences ('psychic income') consumed over an accounting period, and 'capital' as any assets that yielded these flows of utility.

This led to a potentially radically expansive conception of capital, far broader than the 'business stock' definitions found in classical political economy (see Tobin, 2005). Fisher argued, for instance, that: 'wealth is wealth only because of its

services; and services are services only because of their desirability in the mind of man [*sic*]' (Fisher, 1906, p. 41). Thus, Fisher extended the notion of capital to all physical things which yielded desirable events, or prevented undesirable events, including where the benefit they produced was non-monetary (ibid, pp. 1043-4). Even perishable objects used up immediately (like bread) were conceived of as short-lived capital assets, as they yielded psychic income (the pleasure of eating it). Capital had thus been conceptually expanded from durable stock yielding market returns to refer to any parts of the material universe that yield utility to humans - including, foreshadowing the human capital literature, human beings themselves.

However, Fisher's definition also delimited capital in two significant ways. Firstly, it made wealth dependent on ownership and property rights, even if not necessarily the exchange of these rights. For instance, Fisher insisted that, while it 'is not necessary that it should continually change hands... it is necessary that wealth should be owned', and moreover defined wealth formally as 'all those parts of the material universe which have been *appropriated* to the uses of mankind' (ibid, p. 3). This move has had important contemporary repercussions for the accounting treatment of knowledge (discussed below), leading to the focus on measuring the returns on formal qualifications that can be understood as being 'owned' by the student that obtains them.

Secondly, Fisher linked the accounting value of capital back to market returns. Fisher drew a crucial distinction between the physical objects which actually composed wealth ('capital instruments'), and the accounting *value* of capital stocks in monetary units, or 'capital value' (ibid, pp. 66-67). He suggested that:

[E]ach individual kind of wealth may be measured in its own special unit - pounds, gallons, yards; but for most purposes it is more important to measure the value of wealth, and this may be done in dollars and cents, pounds and shillings... this is also a species of physical measurement, *but involves the principle of exchange*... the concept of value [depends] on that of price; that of price in turn on exchange (Fisher, 1906, pp. 9-10).

In this way, Fisher upheld the conflation of price, exchange and value characteristic of neoclassical thought, reproducing the 'economistic fallacy' identified by Polanyi. His justification for this move was to conform to 'business usage', arguing that 'the businessman [*sic*] ordinarily uses the term "capital" in the sense of capital-value' (Fisher, 1906, p. 67).

Hence, while neoclassical capital theory broadened the definition of wealth, it simultaneously circumscribed its meaning. Hypothetically, all utility-yielding objects were now capital, but in practice it was restricted to those enclosed by property rights, and their accounting value could only be established through an estimation of future market returns. This ambiguity - the coexistence of a theoretically expansive definition of capital with a narrow, market-based understanding of its economic value - paved the way both to the proliferation of the concept of capital in post-war economic thought and to contemporary problems encountered in accounting for non-produced assets such as nature and knowledge.

3.2. Rise of the capital accounting approach to sustainable development

It was only with the development of national accounting that regular measurements of national capital stock emerged. At this point, natural and human capital were

explicitly excluded from the emerging system of global economic statistics (UN, 1953, p. 7). Hence at the founding of the national accounts the economic value of knowledge and the natural environment was placed at zero.

Over the post-war decades, the limitations of the asset boundary established by the original SNA became increasingly evident. In the 1970s, the *Limits to Growth* report (Club of Rome, 1972) and environmental economists such as Georgescu-Roegen (1971) placed economic growth within its ecological and thermodynamic constraints. The metaphor of ‘natural capital’ was increasingly used to theorize these shifts (Akerman, 2003), as a conceptual framework through which to understand the services provided to the economy by the natural environment and biosphere (Daly, 1987; Pearce & Atkinson, 1993). At the same time, there was a shift in economic theory towards viewing knowledge and innovation as endogenous to the growth process. Chicago School economists such as Gary Becker began to think about education as a form of investment in future income and wage generation (Becker, 1962; Schultz, 1960). Later, post-war neo-Keynesian growth models – which had posited technological change as an external variable (Solow, 1957) – were replaced by endogenous models which emphasized the institutional drivers of innovation (Romer, 1994). This prompted a change to thinking about education spending and skill development as an investment in the ‘human capital stock’ of a society.

While economists, ecologists and sociologists began thinking of natural resources and human knowledge as components of national wealth over the post-war years, the capital accounting approach has become the dominant framework for *measuring* sustainability in global governance only in the late 2000s (Kulig et al., 2010). The concept of ‘sustainable development’ was popularized by the report of the UN’s World Commission on Environment and Development (1987). The notion of natural capital was mentioned in the Brundtland report (ibid, p. 48), but there were few concerted attempts at formally integrating the depletion of natural resources into national accounting systems in the 1990s – largely because of the complex valuation and methodological challenges involved.

Immediately after Brundtland, two main approaches were taken to the measurement of sustainable development: sustainable development indicators (SDIs) and adjusted GDP measures. Both approaches, however, encountered growing dissatisfaction during the 2000s. SDIs were regarded as having no coherent theoretical foundation, and reflecting the transient policy priorities of different administrations (UNECE & Eurostat & OECD, 2008, pp. 3-4). Composite indicators and adjusted GDP figures also faced criticism for being flawed or theoretically inconsistent, and failing to distinguish clearly between the measurement of current welfare its future sustainability.

Consequently, in the late 2000s the global approach to measuring sustainability was increasingly re-oriented around a more formal wealth accounting framework, rooted in the neoclassical capital theory first outlined by Fisher (Kulig et al., 2010). Influential in this respect was a UN taskforce created in 2005 (UNECE, Eurostat and OECD, 2013). This global taskforce was mandated with formalizing approaches to the measurement of sustainable development, by reviewing the various measurement approaches that had emerged since Brundtland. It strongly advocated a capital-based approach, which understands stocks of natural, human and social capital as additional assets within an extended national balance sheet:

If these stocks are calculated using a common measure and assumptions are made about the substitutability of various capital stocks, changes in the total stock of wealth (per capita) will provide information on the sustainability of the development path of each country (UNECE, Eurostat and OECD, 2013, p. 63).

Work by the OECD (2001), WB, (2006) and UNEP, (2014) also influenced the trend for treating sustainability through the perspective of capital accounting. The recommendations of the Stiglitz Commission cemented this shift. Its final report stated that: ‘sustainability requires the simultaneous preservation or increase in several “stocks” ... of natural resources but also of human, social and physical capital’ (Stiglitz et al., 2010, pp. 77-68).

Consequently, by the beginning of the 2010s the measurement of sustainable development had been re-framed as a problem measuring the depletion or maintenance of comprehensive global ‘capital’, now extended beyond the manufactured and financial stocks within the original SNA asset boundary to include natural resources, ecosystems, human knowledge and social institutions. This has prompted ongoing work by the global statistical and national accounting community to translate this into a practical measurement framework.

4. The development of global human capital accounting

While the wealth accounting approach to measuring sustainability is theoretically elegant, implementing it in practice has posed significant operational challenges. Natural capital accounting has attracted much more attention than HCA: in 2014, the UN System of Environmental-Economic Accounting (SEEA) standardised the measurement of tradeable natural resources in ways consistent with the central SNA framework. But even here, ecosystem resources such as biodiversity stubbornly resist easy valuation or theoretical consensus.

4.1. The global governance of HCA

While it still lacks the international standardisation that the SEEA provides natural capital measurement, in the last decade the human capital agenda has been developed by a variety of actors and initiatives, both at the international level and within NSIs. The OECD played an important role in the early 2010s, through its Human Capital Consortium. This forum brought together experts from 18 countries and two IOs (Eurostat and the International Labour Organization). Building on earlier experimental work (OECD, 2001), it demonstrated the viability of developing monetary estimates of human capital using currently available datasets, to supplement the growth accounting models that inform the OECD’s policy recommendations, such as its annual *Going for Growth* reports.

At the UN Level, the UNECE has played a leading co-ordination role, specifically through the Conference of European Statisticians (CES). CES brings together international statistical and accounting experts from European NSIs to form working parties to develop experimental statistical concepts, with the view to agreeing common methodological approaches to aid comparability and policy uptake. Building on OECD and CES work, in 2016 the UNECE produced a *Guide on Measuring Human Capital*. While lacking the status of a formal UN standard, such as the SNA or SEEA, this is the first global standard for HCA and has formed a

key reference point for its growing use by IOs and NSIs. The UNECE has subsequently created a task force which produces regularly updated monetary estimates of human capital stock based on this Guide (UNECE, 2019).

The World Bank has been at the forefront of mainstreaming HCA in development policy, drawing on these earlier initiatives to develop monetary ‘human capital wealth’ estimates for more than 100 countries (WB, 2018a). This reflects a long-standing interest in wealth accounting as a means to assess the sustainability implications of its development financing and policy work. However, it was given additional impetus in 2018 with the launch of its Human Capital Project, a major cross-Bank initiative to embed human capital into the design of its funding instruments and policy advice (WB, 2018b). The embrace of monetary estimates of human capital by the Bank represents a significant shift, supplementing its non-monetary Human Capital Index.

Thus, international work on HCA has taken place in a variety of forums, focussed on key expert networks and working groups within the OECD, World Bank and UNECE/CES, that have brought together national expertise to catalyse the uptake of HCA in global policy. Alongside this, certain NSIs have emerged as epistemic entrepreneurs. The UK’s ONS stands out, having produced monetary measures of the UK’s human capital stock as early as 2012. A major update to its methodology commenced in 2018, with the eventual aim of ‘integrating human capital into the national accounts’ (ONS, 2018, p. 9). Statistics Norway and Statistics Canada have also been influential, reflected by leadership within international task forces.

Three main approaches have emerged to valuing human capital stock: 1) lifetime income (or output) methods; 2) cost-based (or input) methods, and; 3) residual methods. The lifetime income approach – first developed in academia by Jorgenson and Fraumeni (1992) – is emerging as dominant, endorsed by OECD’s Consortium, the UNECE Guidelines, the World Bank’s human capital wealth estimates and national initiatives (ONS, 2012; UNECE, 2016; WB 2018; Statistics Norway, 2018). However, in the process of operationalizing these methodologies, statistical experts have encountered persistent problems in disentangling the ‘commodity-like’ aspects of education from its wider social, psychological and economic functions. The way in which they handle these methodological dilemmas has significant implications for global welfare and education policy. Two things of global HCA methodologies stand out in this regard: firstly, the implications of focusing on formal qualifications as the site of human capital ‘investment’; secondly, the narrow focus on labor market outcomes as the economic ‘return’ on this investment.

4.2. Education spending as human capital ‘investment’

Somewhat ironically, given the Hayekian emphasis on the importance of tacit local knowledge to the superiority of the market mechanism (Hayek, 1945), market-based methods for valuing human capital currently focus entirely on the labor market returns on formal qualifications. This can be related to the neoclassical treatment of ‘capital’ and its emphasis on ownership and exchange.

However, while qualifications can be understood as the tangible outcome of ‘investment’ in the formation of skills that an individual then sells on the labor

market, this is complicated by the fact that these skills become embodied in this individual and cannot be extracted from them or transferred. Is this knowledge therefore a separate asset the student ‘owns’, or simply an embodied property of them as a person? This ambiguity is reflected in the description of the 2008 SNA asset boundary, where human capital was excluded from official national accounts on the grounds that it ‘become[s] embodied in the persons of the consumers’ (UN, 2008, p. 97) and ‘is acquired through learning, studying and practicing, activities that cannot be undertaken by anybody else on behalf of the student’ (ibid, p. 8).

The subsequent development of international HCA methodologies has been influenced by this exchange-based accounting definition of an asset, premised on knowledge as a transferable, commodity-like good. Discussing the matter, the UNECE guidance critiques the exclusion of knowledge from the SNA, but only on the grounds that:

[I]f one looks upon human capital as a separate, although embodied in a person, entity, it does not seem problematic to view the relevant person owning human capital which clearly brings future economic benefits (UNECE, 2016, p. 20).

Thus, while the definition of capital is extended to skills and knowledge, the guide firmly re-inscribes the neoclassical notion that their economic component is somehow *separate* from the individual who ‘owns’ them. Consequently, all the local know-how of a population that cannot be traced to qualifications built up through formal educational investment are excluded from HCA valuations (ONS, 2012b, p. 29; UNECE, 2016).

Narrowing the scope of human capital to formal education in this way allows workers’ embodied talent and skills to be separated conceptually from formal educational investment and its market returns. It thus allows human capital formation to enter the neoclassical realm of choice and scarcity (students’ choices to delay entry into the workforce to raise future earnings potential, and over which qualifications to acquire). However, this approach has encountered persistent technical and conceptual problems.

Firstly, distinguishing the asset being invested in from the embodied person it is acquired by (and embodied in) is far from straightforward. The same unit of ‘education’ spending can produce different results in brighter or less able students (referred to in HCA literature as the ‘heterogeneity of human capital’). The main way of approaching this problem is to distinguish an underlying genetic component of human capital (outside the scope of accounting valuation) from the economic ‘capital’ built up by educational investment. The ONS states that:

Some of an individual’s capital is innate to them and is in some sense, a non-produced asset. Thus, the asset created by education could be regarded as the improvement in human capital by education and training (ONS, 2012b, p. 9).

Indeed, this heterogeneity was used by the UNECE as a justification for rejecting the cost-based approach to valuing human capital (which focuses on summing depreciated past education spending) and favouring the discounted lifetime income method as better reflecting the ‘true’ economic benefits of this spending.

A wider problem is the clearly vast significance of informal training, knowledge and ‘know-how’ to market activity, and the impossibility of individualising the common pool of knowledge and skills that underpin productive innovation. The UNECE guidance acknowledges, for instance, that: ‘human capital results not only

from schooling and training, but also from general experience both at work and in leisure-time activities' (UNECE, 2016, p. 35); while OECD work previously noted that continued acquisition of skills by adults is 'informal, experiential and interwoven with daily living and working' (OECD, 2001, p. 24). Another problem often discussed in human capital literature is 'spill-over effects', a technical term for the intrinsically social nature of knowledge. The UNECE Guide accepts, for example, the limitations of valuation methods focused on the individual returns on educational spending because they 'focus on individual's human capital and aggregate them to arrive at the population measure. This ignores spill-overs between workers, so that the whole may be more than the sum of the parts' (UNECE, 2016, p. 52).

The scale of the contribution of this informal, collective knowledge, even if considering only the market economy, is huge. An OECD study, for instance, attempted to capture the full contribution of human capital by measuring it using the 'residual' method. Assuming GDP to be a 5% income return on the complete wealth of a society, the study reasoned that the value of overall wealth must amount to 20 times GDP (OECD, 2013). But the wealth observed in SNA balance sheets only amounts to 2.6-6.6 times GDP, even when including natural resources. Even adding an estimate of human capital stock based on the lifetime income of formal education left 25% of this 'total' national wealth unaccounted for. This was attributed to an 'intangible capital residue', reflecting social knowledge and institutions that could not be captured in the private returns to formal education.

Another problem in this regard is the non-transferrable nature of much of the skills and experience that support the market economy. Many of the skills gained in employment relate to a particular institution or process. This is even more the case regarding soft skills such as the inter-personal relationships built up while working with others. It is hard to distinguish these context-specific skills from generic transferrable skills such as 'team-work' – but these are lost as soon as a person moves company or sector. As an OECD report observes: 'individuals are unlikely to be able to extract a full rental value from their organisation-specific skills, since their employer is their sole potential purchaser' (OECD, 2001). Therefore, the status of these skills as 'human capital' is precarious, in neoclassical terms, since they are non-transferrable: their value cannot be established through exchange on the market. Nevertheless, such skills are crucial to supporting market activity and innovation.

Finally, accountants devising human capital methodologies encounter problems disentangling the 'consumption-like' component of education from its productive or 'investment-like' component. This stems fundamentally from the same problem: that education is embedded in non-economic functions and entangled with the embodied life of the person. Isolating its commodity-relevant aspects is almost impossible in practice. A quote from the UNECE guidance on human capital valuation illustrates this point:

To the extent that individuals enjoy their courses or have their range of interests, tastes and activities extended, educational expenditures also provide some consumption benefits. Thus, the difficulty lies in determining which part of educational expenditure is investment spending and which part is consumption (UNECE, 2016, p. 36).

As this shows, part of the problem lies in the neoclassical assumption that productive work must be a disutility (Jevons, 1965 [1871]; Marshall, 2009 [1890]), and therefore the time spent by students acquiring knowledge must be conceptualized as something endured merely for the future consumption possibilities it grants access to. Unfortunately, for this theory, education seems to provide intrinsic pleasure and meaning to many.

Furthermore, formal education generates benefits to the individual that are not directly related to improving their immediate job prospects, but are nevertheless associated with positive labor market outcomes. This is recognized in the human capital literature, but generally these benefits are hived off as ‘social’ or ‘non-economic’ returns on education. The UNECE task force states that ‘many see the personal and social well-being effects of learning as being as important as the economic ones’ (UNECE & Eurostat & OECD, 2008, p. 51). However, this very distinction is hard to sustain. It has been shown, for instance, that higher educational attainment is associated with better health (ONS, 2012b), and improved social networks and connections (OECD, 2001). These, in turn, are correlated with better labor market prospects. This raises the problem of where to stop valuing these less direct market returns on education, and also how far (in increasingly nepotistic neoliberal labor markets) qualifications represent a genuine form of productive ‘investment’ rather than serving as gate-keeping devices that mediate access to networks of power and privilege.

Consequently, even narrowing the measurement of human capital down to formal education, which provides it with a semblance of the neoclassical features of capital reviewed in section 3 (such as fungibility, transferability and choice), it has not been possible to disentangle the ‘economic’ value of these – relevant to the generation of market income – from its other functions. Fundamentally, this relates to the fact that knowledge is a ‘fictitious capital’: its economic function is embedded in and inseparable from its broader social and psychological functions, for both individuals and societies.

4.3. Wages as the ‘return’ on human capital

A second feature of the development of international HCA methodologies has been the difficulty of conceptualising the ‘return’ on educational investment. Cost-based approaches attempt to side-step this problem, by simply measuring the current value of past investment in education, regardless of the outcome. However, there are problems with adapting cost-based accounting tools – designed to measure a stock of physical machinery and equipment – to knowledge embodied in human beings. They require that a measure of depreciation be applied to the outlays on formal education, over a student’s lifetime. This method was developed to value of machinery or plant, that possesses a second-hand re-sale market, a linear aging profile and predictable deterioration through greater use. One can detect an evident desire within HCA literature to think of knowledge in these terms, often using direct similes. The UNECE guide states that: ‘Like physical capital, human capital depreciates over time’, due to ‘the wear and tear of skills due to aging’ (UNECE, 2016, p. 37).

However, there are obvious problems with applying the metaphor of depreciation over a lifespan to the knowledge embodied in human beings. Knowledge and skills often *increase* with experience, and they are bound up with the wider development and life trajectory of the individual. The UNECE guide notes, with apparent surprise, that:

The value of human capital will decrease by aging, and the consequent shortening of the period to retirement or death. This has clear similarities with the shortening of the remaining service life of more traditional assets. On the other hand, human capital is different ... embodied knowledge may actually increase as a result of using it in practice, as a result of gaining more experience, etc. Or vice versa, the stock of human capital may depreciate quicker because of non-use, for example as a result of long-term unemployment (ibid, p. 28).

Elsewhere the ONS acknowledges that ‘the appreciation of human capital is often ignored in the literature, despite some empirical evidence that showed that human capital can appreciate at younger ages’ (ONS, 2012b, p. 8). The UNECE guidance ultimately accepts, based on this, that for cost-based HCA measures: ‘The choice of depreciation for measuring human capital is essentially arbitrary because of a lack of empirical evidence’ (UNECE, 2016, p. 37). In other words, because the idea of an asset as something that is steadily worn down through use is ingrained in the accounting treatment of manufactured capital, depreciation rates developed for machines are applied to the knowledge and skills embodied in humans, even though this bears little resemblance to the empirical reality of how people actually acquire or lose skills.

Consequently, the output-based ‘lifetime income’ approach is generally favoured. This links the present value of human capital to the future labor market earnings of an individual. As one ONS paper strikingly argues:

[I]t is difficult to quantify elements of the education process that produce higher output, accordingly it makes sense to use labor market evaluations as representing the worth of an educated individual (ONS, 2012a, p. 9).

Since the value of human capital is coupled to the generation of market wages, if a person becomes unemployed or retires their contribution to the ‘human capital’ of a nation immediately falls to zero.

This approach produces some counter-intuitive valuation results. It means that the appreciation and depreciation in human capital values relates more to temporary prevailing employment and wage conditions in a country than the substantive content of the skills or knowledge its population possesses. For example, according to ONS estimates, the UK’s human capital base fell from £19 trillion to £18 trillion in the aftermath of the financial crisis, almost entirely due to a short-term rise in unemployment (ONS, 2015). In other words, £1 trillion had been wiped from the extended national balance sheet, not through any deterioration in the skill base of the population or long term demographic trends such as the aging population, but because of cyclical fluctuations in the labor market.

Emerging global HCA methods render the economic value of knowledge dependent on discounted future labor market returns on formal qualifications. However, this has been conceptually and practically problematic to operationalise. Reflecting the ‘economistic fallacy’ of reducing the economic value of knowledge to its market returns, it has proved difficult to disentangle the income-generating aspects of education from its broader value to individuals and society.

5. Human capital accounting and the commodification of global welfare policy

Emerging global HCA methodologies have significant implications for framing national economic policy space. By tying the value of human capital wealth to labor market outcomes, lifetime income approaches naturalize the idea that sustainable welfare systems must be grounded in the expansion of formal wage labor and employment. They therefore measure not the contribution of education systems to the generation of economic welfare *per se*, but rather the comparative degree of commodification in different societies, equating this with the size of the human capital stock and therefore to the ‘sustainability’ of different political economies. This section first discusses some general policy implications of this methodological approach, before analysing how these have manifested themselves in development policy through the case of the World Bank’s Human Capital Project.

5.1. HCA and the future of welfare

The policy rationale for HCA is often framed in terms of assessing the long-term ‘sustainability’ of welfare systems (Statistics Canada, 2010). Potential impacts of the adoption of global HCA methodologies on the framing of national education and welfare policy include: 1) they incentivize states to pursue welfare regimes based on labour market activation, as opposed to de-commodified solutions to welfare challenges; 2) they discourage investment in lifetime learning systems, and encourage activation policies that generate immediate employment rather than re-skilling policies that produce longer term productivity gains; 3) they may incentivise certain forms of education provision over others.

Turning to the first, using lifetime income estimates, policies aimed at redistributing paid employment more evenly across the population to make space for unpaid economic activity necessarily serve to massively depreciate the value of a nation’s human capital stock. This has important consequences for recent debates over the possibility of de-commodified systems of care provision (Fraser, 2014; Gorz, 1999; Tronto, 2017). For instance, the literature on Universal Basic Income takes as a central premise that the sphere of wage work would shrink, and that this would create space for unpaid forms of caring activity and volunteer work, either in the family or the community (Standing, 2017).

Similarly, a substantial feminist literature has argued for the need to reduce working hours and re-distribute work more evenly through job-sharing and part-time working, to increase gender-symmetry in unpaid childcare duties, rather than push for a model based on universal full-time employment and commodified childcare provision (LeBaron, 2010; Lutz, 2017; V. Schultz, 2010). Other potential ways of organising economic activity opened up by technological change, such as the rise of P2P production and the sharing economy (Frenken & Schor, 2017) would also erode human capital, as they would shrink the market ‘returns’ delivered on education, even while they may enhance substantive economic welfare. HCA methodologies re-create a binary distinction between work and leisure that renders them unable to conceptualise these sorts of emergent economic relationships, or complex interactions between the market and non-market spheres.

Secondly, there has been much debate in recent years over the aging population of Western societies and the implications for the sustainability of retirement expectations, pensions and care provision (Hedge & Borman, 2012). The mainstream response to these challenges has been framed around the need to increase the retirement age and extend the formal employment age (Eurofound, 2014). These sorts of policies would indeed appreciate human capital as currently measured, as they would extend the discounted lifetime income used to calculate its value. An alternative perspective has, however, emphasised a more holistic notion of ‘active aging’, stressing the need to facilitate the elderly in engaging with diverse forms of productive activity, including volunteering or mutual support networks (Phillipson, 1998; Walker & Maltby, 2012). This is especially relevant in the context of utilising the skills of those made unemployed towards the end of their working life due to sectoral shifts, automation and de-industrialization.

However, based on the lifetime income method of discounting future wages, the human capital of the elderly is valued at close to zero. This has obvious implications when assessing policies aimed at employing the accumulated knowledge and experience of older people in volunteering, childcare or community contexts. These would not be able to arrest or offset a decline in human capital that resulted from forced early retirement. This also interacts with debates over the design of lifelong education systems, as the value of investing in adult education and re-skilling programmes (Livingstone & Guile, 2012) would be less than educational investment in the school-age population.

Finally, methodologies for valuing human capital may influence the sorts of education that will be prioritized. At the most immediate level, they are likely to prioritize applied vocational skills over general intelligence and creativity. Since these skills are what labor markets values right now, they will enhance immediate labour market prospects and increase the value of human capital. However, this may be at the cost of longer-term welfare gains produced by more generalised forms of intelligence (Means, 2017). The application of uniform discount rates also takes little heed of future shifts in the demand for skills. For instance, some research suggests that soft skill will be increasingly valued as automation leads to a secular shift towards affect-based caring work (Nokelainen et al., 2018). Finally, the sole focus on formal paid education ignores welfare gains that could be produced by the collective or informal provision of education itself (Illich, 1971) – for instance, new forms of mutual learning (based on time-banking and other forms of reciprocity) that digital communication has opened up (Hart, 2001). Because there is no monetary investment involved, policies aimed at institutionalising these social forms appear to erode a nation’s asset base.

5.2. The influence of HCA on development policy: The case of the world bank

To understand how these general features of the political economy of HCA bear upon concrete policy processes, it is instructive to examine the case of the World Bank’s Human Capital Project (HCP), launched in 2018 (WB, 2018b). Based around ‘using policy and results-based lending to support critical human capital reforms’ (WB, 2019c, p. 30), this agenda plays a central role in the Bank’s wider development strategy for poverty eradication by 2030. Through it, the Bank has gone furthest of the major economic governance IOs in embedding human capital accounts into the design and evaluation of its financing practices and policy advice.

In 2018, the World Bank for the first time calculated monetary estimates of the stock of human capital using the lifetime income approach (WB 2018a, p. 116). This was a major change of approach, as previously the Bank has relied solely on an indicators-based approach to human capital measurement. These measures of human capital wealth were developed to support the HCP, and play an increasing role in the Bank's policy advice, country reviews and strategic priorities. As it argued: 'providing an explicit measure of human capital contributes greatly to making wealth accounts more useful for monitoring progress and for policy analysis' (ibid, p. 34). Significantly, these estimates now shape and justify the Bank's policy advice and funding priorities, especially in the field of care, welfare and the labor market.

This can be seen both in regional human capital strategies, and in specific country reviews and surveillance. Turning to the first, in 2019 the Bank launched a human capital plan for the Middle East and North Africa (MENA) region and for Africa, to support the HCP (WB, 2019b; 2019c). These set priorities for the expansion of Bank human capital financing, distributed as 'program-for-results' (P4R) and Development Policy Financing (DPF) grants. In MENA, human capital targeted financing is set to increase from \$1.119bn in 2019 to \$2.5bn by 2024, while in Africa it is set to reach \$15bn by 2021-23 (ibid). They also guide the Bank's policy consultancy and capacity-building work.

In both policy documents, the regions are pathologized on the basis of comparative analysis of their human capital growth rates. For instance, the MENA human capital plan laments how 'with the lowest percentage of human capital as a share of total wealth per capita of any region in the world (35%), MENA faces a severe human capital gap' (WB 2019b, p. 3). This is, moreover, linked explicitly to their relative lack of labour commodification and an insufficiently developed free market economy, or 'informality' in the Bank's terminology. Accordingly, The MENA human capital plan outlines a number of 'priority interventions that can help build, protect, and utilize human capital' (ibid). These involve using targeted funding and policy consultancy to ensure 'young people have access to strong world-class education that equips them with the skills desired by the global job market and/or to start their own innovative businesses in open and competitive markets' (ibid, p. 6) and to reform education systems 'with a focus on employability in the private sector' (ibid, p. 19). In Africa, the Bank likewise seeks to 'reshape its portfolio to encourage impactful human capital projects' (WB, 2019c, p. 24). This means, in practice, encouraging 'workplace learning for better market fit and employability skills' and seeking to 'foster an enabling business environment for wage jobs in firms of all sizes as well as productive, remunerative entrepreneurship activities' (ibid, p. 21).

One interesting feature of this agenda is the way in which it interacts with the Bank's discourse on gender equality and female empowerment. The Bank readily acknowledges in the report outlining its HCA methodology, that:

Although the SNA includes unpaid household production of some goods, it excludes the production by households of services for final consumption within the household, such as family care ... Because these services are excluded from the SNA, they are also excluded from the human capital estimates reported here (WB 2018a, p. 29).

Nevertheless, by the time these measures appear in the regional strategies and country-level analysis, the implications of this important qualification are rarely

unpacked. The measures are used to justify the commodification of care work as the only path to enhancing human capital wealth, by bringing female labor market participation up to parity with male workers. The MENA strategy prioritises ‘creat[ing] formal jobs in the care economy’ and ‘closing the gap in female employment by improving conditions that facilitate women’s insertion into the labor market to realize their potential as productive workers’ (WB, 2019b, p. 19), while the Africa plan likewise emphasises ‘boosting labor market participation, especially for women’ (WB, 2019c, p. 21). The Bank’s MENA Gender Innovation Lab was launched specifically ‘to address the low participation rate of women in the region’s labor markets ... to achieve higher, more sustainable growth’ (WB, 2019e).

This is not to suggest that moves towards gender parity in labour markets are unwelcome. However, the way in which human capital estimates work is to render one particular means of achieving this (full-time employment for *both* genders in the context of the commodification of care provision) contribute to the national balance sheet and therefore sustainability, while other routes (for instance, job sharing and work redistribution for both genders, or commons-based care networks) cannot (LeBaron, 2010). Drawing on the analysis in previous sections, we can understand these policy recommendations as tautological. Because the value of human capital has been made, by methodological design, to depend upon its projected contribution to labour market income, by definition countries with higher levels of de-commodified care provision will have lower human capital wealth.

These dynamics are further highlighted by the way HCA is now influencing country-level Bank’s outputs such as their economic updates. For instance, the Bank used HCA estimates prominently in its Tanzania Economic Update in 2019 (WB, 2019d). Again, these valuations led to the conclusion that ‘human capital as a share of total wealth is lower in Tanzania than in comparison to most other countries’, and consequently ‘Tanzania’s progress toward sustainable development was minimal’ (ibid, p. 4; 37). The policy recommendations on gender equality and empowerment therefore again reflect a focus on commodification to build human capital and address this deficiency. The Bank argued that:

Losses in human capital wealth due to gender inequality in Tanzania are estimated at up to \$111 billion. Interventions in three main areas could narrow the gender earnings gap: (1) reduce the time women spend in unpaid work and redistribute care responsibilities so that they can spend more time in the labor market; (2) give women more access to and control of productive assets; and (3) address market and institutional failures (ibid, p. 6).

By comparison, earlier Bank analysis of human capital in China applauded the ‘very rapid increase in urban human capital from the mid-1990s, in part because of the transition to a market-oriented economy... showing that sustainable development depends on a combination of capital accumulation and sound political economy’ (WB 2018a, p. 33). Again, this shows the circular way in which HCA methods result in commodification boosting national wealth through its impact on human capital stock, thus making ‘sustainability’ depend on a certain market-oriented development trajectory.

As this case highlights, HCA exerts an increasing influence on the policy advice and financing practices of major IOs. HCA standards play a role in determining the conditions attached to the Bank’s various development funding facilities, and how these interventions will be evaluated. Consolidating longer-term trends in the Bank’s approach to poverty and social reproduction (Ruckert, 2010), HCA now

plays an important role in pathologizing certain institutional regimes, notably those premised on de-commodified systems of care. Bank discourse tends to frame these recommendations as neutral, technical assessments of how to build and utilise human capital – a dynamic which has been significantly strengthened by monetary measures of human capital stock.

5.3. Reforming human capital accounting: Beyond the economic fallacy?

Statistical agencies are increasingly reflexive about the limitations of current HCA methods. This has partly come in response to criticism from civil society. The ONS, for instance, publicly consulted on its HCA methodology, encountering opposition to the exclusion of the unemployed from its human capital estimates (ONS, 2012b p. 10). Consequently, two sets of human capital values for the UK are now produced, one of which includes the unemployed. This allows a decomposition of the extent to which depreciation of human capital wealth represents cyclical unemployment or substantive demographic and educational shifts. In these measures, however, the value of knowledge remains tied narrowly to labor market participation. Nevertheless, some more fundamental reforms are being explored, both nationally and by international working groups. There is a willingness to include on-the-job training as well as formal qualifications in the future (ibid, p. 14). More radically, the ONS has suggested the development of methodologies which include the non-market sphere when valuing human capital stock, suggesting ‘future work could incorporate imputations of the value of non-market labor activity, including household production and leisure into the measures of human capital’ (ibid). The agenda on human capital measurement therefore interacts in important ways with the development of accounting tools to estimate non-market activity (Beneria, 1999; DeRock, 2019). If non-market production is included in national income measures, then logically the valuation of human capital must also be extended to include the skills that help people perform these non-market activities.

The political implications for how knowledge is valued are potentially radical: forms of learning that help citizens flourish in their various non-market roles and responsibilities would enter economic statistical systems as a valuable ‘return’ on knowledge. This may have dramatic effects on political assessments of the ‘value for money’ education delivers to society. None of these changes have yet materialized. However, they do raise an important question for a Polanyian analysis of HCA, and post-growth accounting reforms more generally. Would such moves be sufficient to address the economic fallacy reproduced by national accounting frameworks and promote a ‘substantive’ representation of the human economy, and the place of learning and knowledge within it? Indeed, is a Polanyian perspective compatible with such monetary accounting valuation at all?

Some 90 years before contemporary ‘beyond GDP’ statistical reforms, Polanyi’s article on ‘socialist accounting’ explicitly addressed the role accounting systems could play in the overcoming of market-centric economic reasoning (Polanyi 2016 [1922]). In this, he related the interwar socialist calculation debate to his political philosophy, which centred around the possibility of freedom in modern industrial societies with a complex division of labour (Cangiani, 2012). According to this viewpoint, *in natura* calculation by the state (Neurath 2004 [1919]) and prices

resulting from atomised market exchanges (Mises 1935 [1920]) offer an equally flawed basis for responsible ethical action by people in their various diverse economic roles: as workers, consumers, citizens etc. Price formation under global corporate capitalism happened just as much ‘behind the backs’ of citizens as the machinations of remote state bureaucracies. Rather than objective values, market prices reflect the contingent imperatives of a society based around private property; they exclude the social, ethical and environmental externalities that market interactions produce (Polanyi 2016 [1920]). Hence, market price signals cannot give individuals an ‘overview’ of the effects and consequences of the complex economic, social and ecological relationships they are part of, which might form the basis for clear-sighted and responsible ethical action. Neither can delegation of such decision-making to centralised, technocratic planning bodies.

Polanyi suggested a way out of this dilemma, grounded in a radically different approach to accounting. It imagined accounting values as the outcome of an explicitly political process of collective deliberation (Rosner, 1990). This would mean that values for key commodities and resources would reflect social preferences worked out in conscious democratic processes, which could only happen by embedding these valuation practices in participatory institutions within the economic process itself. Therefore, it would be naïve to assume that making technical tweaks alone can address the economistic fallacies identified with the current methods for valuing knowledge.

The question remains, then, how should researchers and movements keen to escape the ‘market mentality’ engage with global statistical methodologies that often reproduces key features of this mode of reasoning? After all, is it not better to have flawed statistics on the value of knowledge to the global political economy than none? In this context it is instructive to recall Herman Daly’s remark, in response to defences of the continued prominence of GDP due to a supposed lack of better alternatives, that ‘no beer is better than poisoned beer’ (in Fioramonti, 2013, p. 82). This could well apply to HCA measures, given the active distortions they introduce into the measurement of ‘sustainability’ and national wealth.

More productively, three implications of this analysis seem clear. Firstly, caution and reflexivity must be applied when using HCA measures developed by NSIs and IOs in policy analysis and academic research. This should involve greater awareness of the political assumptions and choices that are embedded in current methodologies, and qualification of any policy recommendations developed based on such measures. Secondly, national-level democratic conversations about how knowledge is valued within national accounting systems seem long overdue. Citizens assemblies and other innovative democratic mechanisms seem an ideal forum to discuss methodological choices around HCA and their political consequences. This could yield democratically legitimated recommendations to the international statistical community, reflecting the outcome of these deliberations. Thirdly, more national flexibility could be built into global HCA standards so that they could be better tailored to national political economies, without the presumption of full-time universal wage labor as the ideal type of economic relationship.

These moves would, however, conflict with prevailing international statistical norms that prize comparability, harmonisation and ‘objectivity’. They require a broader re-imaging of the traditional relationship between statistical agencies and democratic politics. Confronting the challenges of measuring post-industrial

economies requires that international accounting experts are no longer be viewed as technocrats that hand down authoritative metrics to referee national political debates, but rather as co-creators that work with societies to ‘upload’ democratic choices about how to represent complex and incommensurable economic values into global statistical practice.

6. Conclusion

This paper has argued for the need for IPE literature to take the political economy of human capital valuation seriously. Through a historical genealogy of human capital theory, and analysis of contemporary policy documents and expert interviews, it has demonstrated how emerging international HCA practices have important implications for framing national economic policy space. In contrast to the depoliticised discussion encountered in accounting literature, it has argued for understanding these as contingent political constructions that naturalize contestable market-centric ideas about the value of knowledge, rooted in Karl Polanyi’s critique of the ‘economistic fallacy’. Since these emergent accounting practices establish a connection between the value of human capital stock (and thus national wealth) and market income, the ‘sustainability’ of national development trajectories is made to depend upon expanding participation in commodified relationships. Used as an input into political assessments of ‘sustainable development’, and to formulate development policy within IOs such as the World Bank, these methods represent development trajectories predicated on various forms of non-market institutions as *unsustainable*, as they would necessarily erode a country’s human capital stock (even if they delivered substantive welfare gains). This finding is especially noteworthy given that HCA forms a key part of the ‘beyond growth’ agenda in global governance. Yet, as the case of the World Bank’s Human Capital Plan illustrates, dominant international HCA standards in fact serve to promote market-driven growth through their methodological design. This highlights how, to understand the politics of economic governance agendas, it is crucial for constructivist scholarship to look beyond institutional discourse to study the way in which ideational shifts are operationalised through various technical and material practices.

The analysis has several implications. The first concerns the effect of international measurement practices on national democracy and economic policy space. If a general criterion for policy indicators is that different available means for attaining a desired outcome should not be built into the way in which that outcome is measured (i.e., that they should measure outcomes independently of policy inputs), currently dominant international methodologies fall short of this criterion. The methods for measuring sustainable development pre-suppose the institutional regimes and policy priorities through which it is to be achieved: commodified solutions are, by methodological design, the only way to increase the human capital base of a nation and place societies on a ‘sustainable’ footing. This shows the importance of careful analysis of the assumptions which underpin accounting and valuation practices disseminated by global governance, and their role in political discourse. More specifically, it illustrates the need to critically analyze political discourses that draw upon these valuations in support of claims about the economic necessity of the expansion of wage labour, at the expense of alternative means of

institutionalising welfare provision in response to the challenges of demographic change and automation.

HCA remains an emerging field of international statistical practice. While its use within IOs and states is expanding, the article has also highlighted the contested and contestable nature of human capital measurement. It locates the source of this in the essential embeddedness of knowledge and education in non-market processes, placing it in inherent tension with dominant neoclassical wealth accounting frameworks based on the discounted future market returns on an asset. It has shown how this tension has manifested itself in a number of paradoxes and tensions in HCA frameworks, which statistical practitioners themselves are acutely aware of. This highlights the value of further research as these measures diffuse more widely in national and international policymaking. In particular, this research should prioritise understanding changes in the dominant accounting methodologies, their ongoing diffusion into the economic policy discourses of IOs and states, and how they are mobilized by different political actors within debates on the future of welfare policy.

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References

- Akerman, M. (2003). What does 'natural capital' do? The role of metaphor in economic understanding of the environment. *Environmental Values*, 12(4), 431–448. <https://doi.org/10.3197/096327103129341397>
- Aragão, R., & Linsi, L. (2020). Many shades of wrong: What governments do when they manipulate statistics. *Review of International Political Economy*. <https://doi.org/10.1080/09692290.2020.1769704>.

- Barry, A. (2002). The anti-political economy. *Economy and Society*, 31(2), 268–284. <https://doi.org/10.1080/03085140220123162>
- Becker, G. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70(5, Part 2), 9–49. <https://doi.org/10.1086/258724>
- Beneria, L. (1999). The enduring debate over unpaid labor. *International Labor Review*, 138(3), 287–309.
- Block, F., & Somers, M. (2014). *The power of market fundamentalism*. Harvard University Press.
- Broome, A., & Quirk, J. (2015). Governing the world at a distance: The practice of global benchmarking. *Review of International Studies*, 41(5), 819–841. <https://doi.org/10.1017/S0260210515000340>
- Çalışkan, K., & Callon, M. (2009). Economization, Part 1: Shifting attention from the economy towards processes of economization. *Economy and Society*, 38(3), 369–398. <https://doi.org/10.1080/03085140903020580>
- Callon, M. (1998). The embeddedness of economic markets in economics. In M. Callon (Ed.), *The laws of the markets* (pp. 1–57). Blackwell. <https://doi.org/10.1111/j.1467-954X.1998.tb03468.x>
- Callon, M. (2010). Performativity, misfires and politics. *Journal of Cultural Economy*, 3(2), 163–169. <https://doi.org/10.1080/17530350.2010.494119>
- Cangiani, M. (2012). ‘Freedom in a complex society’: The relevance of Karl Polanyi’s political philosophy in the neoliberal age. *International Journal of Political Economy*, 41(4), 34–53. <https://doi.org/10.2753/IJP0891-1916410403>
- Carruthers, B., & Espeland, W. (1991). Accounting for rationality: Double-entry bookkeeping and the rhetoric of economic rationality. *American Journal of Sociology*, 97(1), 31–69. <https://doi.org/10.1086/229739>
- Christophers, B. (2011). Making finance productive. *Economy and Society*, 40(1), 112–140. <https://doi.org/10.1080/03085147.2011.529337>
- Club of Rome. (1972). *The limits to growth*. <http://www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf>.
- Collini, S. (2012). *What are universities for?* Penguin.
- Dale, G. (2010). *Karl Polanyi: The limits of the market*. Polity.
- Daly, H. (1987). The economic growth debate: What some economists have learned but many have not. *Journal of Environmental Economics and Management*, 14(4), 323–336. [https://doi.org/10.1016/0095-0696\(87\)90025-8](https://doi.org/10.1016/0095-0696(87)90025-8)
- Davis, K., Kingsbury, B., & Merry, S. (2012). Indicators as a technology of global governance. *Law & Society Review*, 46(1), 71–104. <https://doi.org/10.1111/j.1540-5893.2012.00473.x>
- DeRock, D. (2019). Hidden in plain sight: Unpaid household services and the politics of GDP measurement. *New Political Economy*, 1–16. <https://doi.org/10.1080/13563467.2019.1680964>
- Elias, J., & Scarbrough, H. (2004). Evaluating human capital: An exploratory study of management practice. *Human Resource Management Journal*, 14(4), 21–40. <https://doi.org/10.1111/j.1748-8583.2004.tb00131.x>
- Eurofound. (2014). *Sustainable work: Towards better and longer working lives*. https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1457en.pdf
- Fioramonti, L. (2013). *Gross domestic problem: The politics behind the world’s most powerful number*. Zed Books.
- Fisher, I. (1896). What is capital? *The Economic Journal*, 6(24), 509–534. <https://doi.org/10.2307/2957184>
- Fisher, I. (1906). *The nature of capital and income*. MacMillan.
- Fraser, N. (2014). Can society be commodities all the way down? Post-Polanyian reflections on capitalist crisis. *Economy and Society*, 43(4), 541–558. <https://doi.org/10.1080/03085147.2014.898822>
- Freuden, K., & Schor, J. (2017). Putting the sharing economy into perspective. *Environmental Innovation and Societal Transitions*, 23, 3–10. <https://doi.org/10.1016/j.eist.2017.01.003>
- Georgescu-Roegen, N. (1971). *The entropy law and the economic process*. Harvard University Press.
- Gorz, A. (1999). *Reclaiming work: Beyond the wage-based society*. Polity.
- Hansen, H., & Porter, T. (2012). What do numbers do in transnational governance? *International Political Sociology*, 6(4), 409–426. <https://doi.org/10.1111/ips.12001>
- Hardt, M., & Negri, A. (2005). *Multitude: War and democracy in the age of empire*. Penguin.

- Hart, I. (2001). Deschooling and the Web: Ivan Illich 30 years on. *Educational Media International*, 38(2–3), 69–76. <https://doi.org/10.1080/09523980110041449a>
- Hayek, F. (1945). The use of knowledge in society. *The American Economic Review*, 35(4), 519–530.
- Hedge, J., & Borman, W. (2012). *The Oxford handbook of work and aging*. Oxford University Press.
- Holmes, C. (2012). Problems and opportunities in Polanyian analysis today. *Economy and Society*, 41(3), 468–484. <https://doi.org/10.1080/03085147.2012.682004>
- Holmes, C., & Yarrow, D. (2019). Economic ideas. In G. Dale, C. Holmes, & M. Markantonatou (Eds.), *Karl Polanyi's political and economic thought: A critical guide* (pp. 7–25). Agenda.
- Holton, R. (1992). *Economy and society*. Routledge.
- Illich, I. (1971). *Deschooling society*. Harper & Row.
- Jevons, W. (1965 [1871]). *The theory of political economy*. Sentry Press.
- Jorgenson, D., & Fraumeni, B. (1992). The output of the education sector. In *Output measurement in the service sectors* (pp. 303–341). University of Chicago Press.
- Karabell, Z. (2014). *The leading indicators: A short history of the numbers that rule our world*. Simon and Schuster.
- Kelley, J., & Simmons, B. (2015). Politics by number: Indicators as social pressure in international relations. *American Journal of Political Science*, 59(1), 55–70. <https://doi.org/10.1111/ajps.12119>
- Kranke, M., & Yarrow, D. (2019). The global governance of systemic risk: How measurement practices tame macroprudential politics. *New Political Economy*, 24(6), 816–832. <https://doi.org/10.1080/13563467.2018.1545754>
- Kulig, A., Kolfoort, H., & Hoekstra, R. (2010). The case for the hybrid capital approach for the measurement of the welfare and sustainability. *Ecological Indicators*, 10(2), 118–128. <https://doi.org/10.1016/j.ecolind.2009.07.014>
- LeBaron, G. (2010). The political economy of the household: Neoliberal restructuring, enclosures, and daily life. *Review of International Political Economy*, 17 (5), 889–912. <https://doi.org/10.1080/09692290903573914>
- Linsi, L., & Mügge, D. (2019). Globalization and the growing defects of international economic statistics. *Review of International Political Economy*, 26(3), 361–383. <https://doi.org/10.1080/09692290.2018.1560353>
- Livingstone, D., & Guile, D. (2012). *The knowledge economy and lifelong learning: A critical reader*. Sense.
- Lutz, H. (2017). Care as a fictitious commodity: Reflections on the intersections of migration, gender and care regimes. *Migration Studies*, 5(3), 356–368. <https://doi.org/10.1093/migration/mnx046>
- MacKenzie, D. (2005). Opening the black boxes of global finance. *Review of International Political Economy*, 12(4), 555–576. <https://doi.org/10.1080/09692290500240222>
- Marshall, A. (2009 [1890]). *Principles of economics*. Cosimo.
- Means, A. (2017). Education for a post-work future: Automation, precarity, and stagnation. *Knowledge Cultures*, 5(1), 21–40.
- Miller, P. (2008). Calculating economic life. *Journal of Cultural Economy*, 1(1), 51–64. <https://doi.org/10.1080/17530350801913643>
- Mitchell, T. (1998). Fixing the economy. *Cultural Studies*, 12(1), 82–101. <https://doi.org/10.1080/095023898335627>
- Mitchell, T. (2008). Rethinking economy. *Geoforum*, 39(3), 1116–1121. <https://doi.org/10.1016/j.geoforum.2006.11.022>
- Mises, L. (1935 [1920]). Economic calculation in the socialist commonwealth. In F. Hayek (Ed.), *Collectivist economic planning* (pp. 87–130). Routledge.
- Mügge, D. (2016). Studying macroeconomic indicators as powerful ideas. *Journal of European Public Policy*, 23(3), 410–427. <https://doi.org/10.1080/13501763.2015.1115537>
- Mügge, D., & Stellinga, B. (2015). The unstable core of global finance: Contingent valuation and governance of international accounting standards. *Regulation & Governance*, 9(1), 47–62. <https://doi.org/10.1111/rego.12052>
- Muniesa, F. (2014). *The provoked economy: Economic reality and the performative turn*. Routledge.
- Neurath, O. (2004 [1919]). Economics in kind, calculation in kind and their relation to war economics. In T. Uebel & R. Cohen (Eds.), *Economic writings: Selections 1904–1945* (pp. 299–311). Kluwer.

- Nokelainen, P., Nevalainen, T., & Niemi, K. (2018). Mind or machine? Opportunities and limits of automation. In C. Harteis (Ed.), *The impact of digitalization in the workplace* (pp. 13–24). Springer.
- Organisation for Economic Co-operation and Development (OECD). (2001). The well-being of nations: The role of human and social capital. www.oecd.org/site/worldforum/33703702.pdf
- Organisation for Economic Co-operation and Development (OECD). (2012). *Approaches to measuring the stock of human capital*. https://www.oecd-ilibrary.org/economics/approaches-to-measuring-the-stock-of-human-capital_5k8zlm5bc3ns-en
- Organisation for Economic Co-operation and Development (OECD). (2013). *Human capital, tangible wealth and the intangible capital residue*. [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=std/doc\(2013\)2&doclanguage=en](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=std/doc(2013)2&doclanguage=en)
- Office for National Statistics (ONS). (2012a). *Measuring national wellbeing: Education and skills*. http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/dcp171766_268091.pdf
- Office for National Statistics (ONS). (2012b). *Measuring the UK's human capital stock: Methodology guidance*. <http://www.ons.gov.uk/ons/guide-method/user-guidance/well-being/publications/human-capital—methodology-paper.pdf>
- Office for National Statistics (ONS). (2015). *Human capital estimates 2014*. <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/humancapitalestimates/2015-08-25/pdf>
- Office for National Statistics (ONS). (2018). *Human capital workplan*. <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/humancapitalworkplan/2018>.
- Ostrom, E. (2015). *Governing the commons*. Cambridge University Press.
- Pearce, D., & Atkinson, G. (1993). Capital theory and the measurement of sustainable development: An indicator of “weak” sustainability. *Ecological Economics*, 8(2), 103–108. [https://doi.org/10.1016/0921-8009\(93\)90039-9](https://doi.org/10.1016/0921-8009(93)90039-9)
- Peters, M. (2009). National education policy constructions of the “knowledge economy”: Towards a critique. *The Journal of Educational Enquiry*, 2(1), 1–22.
- Phillipson, C. (1998). *Reconstructing old age: New agendas in social theory and practice*. Sage.
- Polanyi, K. (1968). *Primitive, archaic, and modern economies: Essays of Karl Polanyi*. Anchor.
- Polanyi, K. (1977). *The livelihood of man*. Academic Press.
- Polanyi, K. (2001 [1944]). *The great transformation: The political and economic origins of our time*. Beacon Press.
- Polanyi, K. (2014). *For a new west: Essays, 1919–1958*. Polity.
- Polanyi, K. (2016 [1922]). Socialist accounting. *Theory and Society*, 45(5), 385–427.
- Porter, T. (1996). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton University Press.
- Robbins, L. (2008 [1932]). The nature and significance of economic science. In D. Hausmann (Ed.), *The philosophy of economics* (pp. 73–99). Cambridge University Press.
- Romer, P. (1994). The origins of endogenous growth. *Journal of Economic Perspectives*, 8(1), 3–22. <https://doi.org/10.1257/jep.8.1.3>
- Rosner, P. (1990). Karl Polanyi on socialist accounting. In *The life and work of Karl Polanyi* (pp. 55–65). Black Rose.
- Ruckert, A. (2010). The forgotten dimension of social reproduction: The world bank and the poverty reduction strategy paradigm. *Review of International Political Economy*, 17(5), 816–839. <https://doi.org/10.1080/09692291003712113>
- Schultz, T. (1960). Capital formation by education. *Journal of Political Economy*, 68(6), 571–583. <https://doi.org/10.1086/258393>
- Schultz, T. (1993). The economic importance of human capital in modernization. *Education Economics*, 1(1), 13–19. <https://doi.org/10.1080/096452993000000003>
- Schultz, V. (2010). Feminism and workplace flexibility. *Connecticut Law Review*, 42(4), 1203–1222.
- Simons, M. (2006). Learning as investment: Notes on governmentality and biopolitics. *Educational Philosophy and Theory*, 38(4), 523–540. <https://doi.org/10.1111/j.1469-5812.2006.00209.x>
- Smith, A. (1993 [1776]). *An inquiry into the nature and causes of the wealth of nations*. Oxford University Press.
- Solow, R. (1957). Technical change and the aggregate production function. *The Review of Economics and Statistics*, 39(3), 312–320. <https://doi.org/10.2307/1926047>

- Spence, C., & Carter, D. (2011). Accounting for the general intellect: Immaterial labor and the social factory. *Critical Perspectives on Accounting*, 22(3), 304–315. <https://doi.org/10.1016/j.cpa.2010.12.007>
- Standing, G. (2017). *Basic income: And how we can make it happen*. Penguin.
- Statistics Canada. (2010). *Estimates of human capital in Canada*. <https://www150.statcan.gc.ca/n1/en/pub/11f0027m/11f0027m2010062-eng.pdf?st=5FMzmiNU>
- Statistics Norway. (2018). *Measuring human capital for Norway 2007-2014*. <https://www.ssb.no/en/nasjonalregnskap-og-konjunkturer/artikler-og-publikasjoner/attachment/364438?ts=16639e49e40>
- Steans, J., & Tepe, D. (2010). Social reproduction in International Political Economy: Theoretical insights and international, transnational and local sitings. *Review of International Political Economy*, 17(5), 807–815. <https://doi.org/10.1080/09692290.2010.481928>
- Stiglitz, J., Sen, A., Fitoussi, J.-P. (2010). *Report by the commission on the measurement of economic performance and social progress*. <https://ec.europa.eu/eurostat/documents/118025/118123/Fitoussi+Commission+report>
- Tronto, J. (2017). There is an alternative: *Homines curans* and the limits of neoliberalism. *International Journal of Care and Caring*, 1(1), 27–43. <https://doi.org/10.1332/239788217X14866281687583>
- Tobin, J. (2005). Fisher's 'the nature of capital and income'. *The American Journal of Economics and Sociology*, 64(1), 207–214. <https://doi.org/10.1111/j.1536-7150.2005.00359.x>
- United Nations (UN). (1953). *System of National Accounts 1953*. <https://unstats.un.org/unsd/nationalaccount/docs/1953SNA.pdf>
- United Nations (UN). (2008). *System of National Accounts 2008*. <https://unstats.un.org/unsd/nationalaccount/docs/sna2008.pdf>
- United Nations Economic Commission for Europe (UNECE). (2016). *Guide on measuring human capital*. <https://www.unece.org/fileadmin/DAM/stats/publications/2016/HumanCapitalGuide.web.pdf>
- United Nations Economic Commission for Europe (UNECE). (2019). *Satellite account for education and training*. https://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2019/ECE_CES_2019_5-1905578E.pdf
- United Nations Economic Commission for Europe (UNECE), Eurostat and Organisation for Economic Co-operation and Development (OECD). (2013). *Framework and suggested indicators to measure sustainable development*. https://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2013/SD_framework_and_indicators_final.pdf
- United Nations Economic Commission for Europe (UNECE), Eurostat and Organisation for Economic Co-operation and Development (OECD). (2008). *Measuring sustainable development*. <https://www.oecd.org/greengrowth/41414440.pdf>
- UN Environment Programme (UNEP). (2014). *Inclusive wealth report 2014*. http://www.ihdp.unu.edu/docs/Publications/Secretariat/Reports/SDMs/TWR_SDM_2014.pdf
- Walker, A., & Maltby, T. (2012). Active ageing: A strategic policy solution to demographic ageing in the European Union. *International Journal of Social Welfare*, 21, S117–S130. <https://doi.org/10.1111/j.1468-2397.2012.00871.x>
- Watson, M. (2005). *Foundations of international political economy*. Palgrave Macmillan.
- World Commission on Environment and Development. (1987). *Our common future*. <http://www.un-documents.net/our-common-future.pdf>
- World Bank (WB). (2006). *Where is the wealth of nations? Measuring capital for the 21st century*. <http://siteresources.worldbank.org/INTEEI/214578-1110886258964/20748034/All.pdf>
- World Bank (WB). (2018a). *The changing wealth of nations 2018*. <https://openknowledge.worldbank.org/bitstream/handle/10986/29001/9781464810466.pdf>
- World Bank (WB). (2018b). *The human capital project*. <https://openknowledge.worldbank.org/bitstream/handle/10986/30498/33252.pdf?sequence=5&isAllowed=y>
- World Bank (WB). (2019a). *World development report 2019*. <http://documents.worldbank.org/curated/en/816281518818814423/2019-WDR-Report.pdf>
- World Bank (WB). (2019b). *Middle East and North Africa human capital plan*. <http://pubdocs.worldbank.org/en/907071571420642349/HCP-MiddleEast-Plan-Oct19.pdf>
- World Bank (WB). (2019c). *Africa human capital plan*. <https://docplayer.net/134705313-Africa-human-capital-plan-powering-africa-s-potential-through-its-people.html>

World Bank (WB). (2019d). *Tanzania economic update*. <http://documents.worldbank.org/curated/en/873031563454513018/pdf/Tanzania-Economic-Update-Human-Capital-The-Real-Wealth-of-Nations.pdf>

World Bank (WB). (2019e). *Demand for World Bank financing and global knowledge remains strong in the Middle East and North Africa*. <https://www.worldbank.org/en/news/press-release/2019/07/18/demand-for-world-bank-financing-and-global-knowledge-remains-strong-in-middle-east-and-north-africa>

Yarrow, D. (2018). *Accounting against the economy: The beyond GDP agenda and the limits of the 'Market Mentality'* [Doctoral dissertation]. <http://wrap.warwick.ac.uk/120932/>